

★ SEP 3 1903 ★

VIRGINIA

AGRICULTURAL EXPERIMENT STATION.

BULLETIN No. 134, MARCH, 1902.

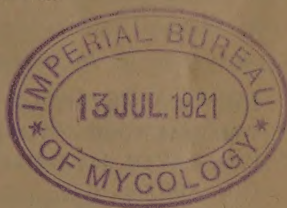
NEW SERIES.

VOLUME XI.

No. 3

ORCHARD STUDIES.—VII. Spraying the Plum Orchard.
Notes on Varieties of Domestica Plums.

W. B. Alwood & H. L. PRICE.



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ORCHARD STUDIES—VII.

Notes on Spraying Plums.

The production of plums is yearly becoming more important in this State. All of the natives and many varieties of the Japanese group are quite hardy and productive in this climate, while the varieties of the *Domestica* class succeed well when protected from fungous diseases. In the Station orchard leaf diseases (chiefly *Cylindrosporium padi*) and the brown rot (*Sclerotinia fructigena*) are so common and difficult to control on the *Domestica* varieties that unless thorough and persistent spraying is practiced the trees soon succumb to these troubles. Certain hardy varieties like Lombard are able to survive despite the presence of disease, but all of the best table varieties are much weakened and finally destroyed unless most carefully sprayed. Yet even when the most thorough spraying is practiced it seems next to impossible to control the brown rot so as to secure a crop of fruit in the unfavorable seasons.

It has been a common practice in the Station orchards to commence spraying for these diseases very early in the season. We first give a winter treatment with bluestone solution made by using 2 pounds bluestone to 50 gallons water. This is applied during the dormant season and is followed by an application of Bordeaux mixture (4-5-50) about the time the buds begin to swell. The above treatments are supplemented by later sprayings with Bordeaux mixture, the number of applications depending upon weather conditions. Ordinarily we spray five or six times, including the above applications. This course of treatment has been adopted here after considerable experience and observation. In order to determine more definitely the limits of necessary treatment for these diseases, cer-

tain modifications were made in treating a number of trees during the season of 1901. The season of 1901 was especially favorable to the growth of fungous parasites, and the applications were consequently extended beyond our usual custom. One tree each of Imperial, Lombard and Reine Claude were given only the first two treatments mentioned above—viz., with bluestone on March 13th, and Bordeaux mixture on April 27th. One tree each of Imperial and Lombard were given the above and two additional applications with Bordeaux on May 5th and 17th. One tree each of Imperial and Lombard were given the first two applications, skipped at the third and fourth applications, but sprayed May 24th, June 7th, July 17th and August 1st with Bordeaux mixture. One tree each of the above varieties were given eight consecutive applications, beginning with the bluestone, while still dormant, and ending with the treatment of August 1st. A tabulated statement of the several treatments during 1901, with brief notes of results, is given below:

TABULATED STATEMENT OF THE SEVERAL TREATMENTS DURING 1901.

VARIETIES.	CONDITION OF TREES AUGUST 1, 1901.								CONDITION OF TREES SPRING OF 1902.
	(1) Bluestone—March 13th.	(2) Bordeaux—April 27th.	(3) Bordeaux—May 2d.	(4) Bordeaux—May 17th.	(5) Bordeaux—May 24th.	(6) Bordeaux—June 7th.	(7) Bordeaux—July 17th.	(8) Bordeaux—August 2d.	
								Per Cent Rot—August 1st	
Imperial (1) . . .	+	+	+	+	+	+	+	2	April 28—Foliage open, tree vigorous, light bloom.
Imperial (2) . . .	+	+	+	+	+	+	+	9	April 28—Foliage open and apparently healthy, no bloom.
Imperial (3) . . .	+	+	+	+	+	+	+	2	April 28—Foliage open, tree vigorous and healthy, no bloom.
Imperial (4) . . .	+	+	+	+	+	+	+	2	April 28—A few limbs in top of tree putting out leaves, small limbs dead, no bloom.
Lombard (1) . . .	+	+	+	+	+	+	+	10	April 28—No bloom; foliage more backward than on 2 and 3.
Lombard (2) . . .	+	+	+	+	+	+	+	8	April 28—Foliage open and 10% crop of bloom.

VARIETIES.	CONDITION OF TREES AUGUST 1, 1901.								CONDITION OF TREES SPRING OF 1902.	
	(1) Bluestone—March 13th.	(2) Bordeaux—April 27th.	(3) Bordeaux—May 2d.	(4) Bordeaux—May 17th.	(5) Bordeaux—May 24th.	(6) Bordeaux—June 7th.	(7) Bordeaux—July 17th.	(8) Bordeaux—August 2d.	Per Cent. Rot—August 1st.	
Lombard (3) . . .	+	+	—	—	+	+	+	+	8	April 28—Foliage open, 15% crop of bloom.
Lombard (4) . . .	+	+	—	—	+	—	—	—	15	April 28—Foliage open, no bloom.
Reine Claude (1) .	+	+	+	+	+	+	+	+	20	April 24—In full bloom, 85% crop of bloom.
Reine Claude (2) .	+	+	—	—	—	—	—	—	30	April 24—Bloom buds begin- ning to open. April 28—Bloom opening, 15% of bloom.

The bluestone solution was made by dissolving 2 pounds bluestone in 50 gallons of water. The first four applications of Bordeaux were of the 4-5-50 formula, and the remaining three of the 3-6-50 formula.

+ Indicates treatment.

— Indicates treatment omitted.

It will be noticed by an inspection of the above table that but slight difference occurs between the trees that did not receive the third and fourth treatment and those that were given the full number of applications. The results are more marked in case of the trees that were neglected after the third and fourth applications.



Fig. 9—Reine Claude (Sprayed).

Especially is this true with respect to condition of the foliage and general vigor of the tree. While Lombard was able to carry its foliage well into the fall under this condition of neglect, the two unsprayed Imperials, one receiving two applications and the other



Fig. 10—Reine Claude (Unsprayed).

four, suffered greatly from leaf diseases and dropped their foliage quite early (Fig. 12). At the very end of the growing season, the last week in September, the fourth tree (unsprayed) of Imperial attempted to put out new foliage, thus further accentuating its weak-



Fig. 11—Imperial (Sprayed).

ened condition (Fig. 13). The Reine Claude, which received only two applications, suffered greatly also, and was quite bare of foliage before the close of the summer (Fig. 10), while the sprayed tree carried a dense foliage late in the season (Fig. 9). The untreated trees of the three varieties bore a fair crop of fruit, which was almost

as free from brown rot as that of the sprayed trees, but on account of loss of foliage it failed to mature, never reaching over two-thirds normal size, and later shrivelled to such an extent as to render it entirely worthless.

All of the trees which received only the two first applications, with the exception of Lombard, dropped their foliage three to six weeks in advance of the sprayed trees. Furthermore, they made but little wood growth, and failed to mature a crop of bloom buds for the following year. Brief notes are given in the above table setting forth the condition of the trees the following spring. The results at that time were quite striking; even the Lombards which received but two applications, and had thus far apparently suffered but little from lack of treatment, showed quite plainly that they were weaker than the other trees. The treated trees of this variety, although carrying a light crop of bloom, set a fair crop of fruit, while the trees which did not receive the later applications were without bloom and fruit.

The season of 1902 was not so favorable as the preceding one to the development of fungus disease, and none of the varieties were sprayed more than the usual number of times. The second and fourth trees of Imperial, first and fourth of Lombard, and the second tree of Reine Claude were again left unsprayed. The results are that both unsprayed Imperials were greatly injured by this neglect, one (No. 4) being practically dead this spring (1903), while the neglected Reine Claude is so much weakened that it will not likely recover. The Lombards do not appear to be greatly injured. All of the sprayed trees of these varieties are in good condition at this time.

It is thus clearly demonstrated by this simple experiment that summer spraying is necessary in this locality in order to protect the foliage on the plum trees of this class.

Spraying for brown rot should begin early in the season and continue until the fruit is quite mature. The bloom, leaves, and often the twigs, are badly attacked by the fungus early in the spring before the fruit is far enough advanced to show the trouble.

The cuts used bring out very clearly the striking results of thorough and partial treatment. At Fig. 9 is given a photo of sprayed Reine Claude (No. 1), made September 9, 1901, while Fig. 10 shows

the condition of an adjacent tree (No. 2), of same variety, at same date. This tree is still alive after a second season's neglect, but it so seriously injured that it will probably never recover. Fig. 11 is from a photograph of a sprayed tree (No. 3) of Imperial, made July



Fig. 12—Imperial (Unsprayed.)

8, 1901; Fig. 12 shows the condition at this time of the unsprayed tree (No. 4) of the same variety; Fig. 13 is from a photograph of same tree made later in the season, September 30th. At this time the tree is making a second growth of leaves on the tips of its topmost branches.

Summary.

1. Varieties of plums of the *Domestica* class suffer greatly in this locality from attack of brown rot, and are also seriously injured by various leaf diseases.

2. To control brown rot it is necessary to begin spraying early, else the crop is often destroyed in the blooming stage. The first application should be made during the dormant season. This may consist of bluestone solution or Bordeaux mixture.

3. If the brown rot is to be held in check, it is necessary to spray with Bordeaux mixture at intervals during the entire growing season. The number of applications necessary will depend upon weather conditions.

4. If rot is prevalent when fruit is near maturity, spraying at this time checks the disease to a marked degree. It is also advisable to pick and remove from orchard all diseased fruit.

5. Late spraying is especially advantageous in the control of the leaf diseases, and is necessary with *Domestica* plums if a healthy foliage is to be maintained to the end of the growth period.

Notes on Varieties of *Domestica* Plums.

AGEN (*Prune of*). This is an old and well-known variety of European origin. The tree is a rather weak grower, although apparently quite hardy. A fair bearer. Season late; ripens latter part of August and first of September. Fruit medium in size, purplish color; flesh greenish, meaty, though tender, and of very good quality. This is one of the best varieties of the prune group that we have tested here. It is seldom attacked by brown rot. Recommended for home use.

BAVAY. This well-known variety originated in Belgium. It has not proved profitable on our soil. The tree is fairly vigorous in growth, but lacks hardiness. None of the trees have been productive. Fruit small, but of good quality; quite subject to brown rot. Season late; ripens September 1st. Not recommended for general planting.

BRADSHAW. This variety is of American origin. The tree proves to be a rather slow grower and is not altogether hardy, but is fairly productive. Fruit of large size, purple color and quite showy, excellent

quality, but subject to rot. Season medium early; ripens last of July. This is one of the very best of our amateur plums, and is highly prized both for eating out of hand and for culinary uses. Strongly recommended for planting in the home orchard, but needs extra care. It is grown to a considerable extent for market in certain favored localities.



Fig. 13—Same Tree as in Fig. 12, making new growth in September.

BUNKER HILL. The origin of this variety is unknown to us. The tree is upright in growth, fairly vigorous and quite hardy; bears good crops of fruit. Season late; ripens last of August. The fruit is a small blue plum, resembling the damsons very closely, but is consider-

ably larger and has flesh of a different character. We recommend this variety as a culinary plum for home use.

ENGLEBERT, Prince. This old variety originated in Belgium. The tree is a rather weak grower and only moderately productive. Fruit below medium size; flesh meaty, firm and of excellent quality. Season medium; ripens August 1st to 15th. Not recommended for general planting.

GUEII. This variety originated in New York State. The tree is a vigorous grower and is quite hardy. Fruit of large size, blue in color, and of good quality. Usually a heavy bearer. This year (1903) when nearly all of the Domesticas were killed in the bud, Geuii was uninjured and is now loaded with fruit. Ripens August 15th. We consider this the best general purpose blue plum of the Domestica type. Highly recommended for general planting.

GERMAN PRUNE. Originated in Germany. Tree a fair grower and hardy, but lacks productiveness; does not equal Agen in bearing, but is a stronger grower. Fruit of fair quality for its class. Season late; ripens September 1st. Nothing to specially commend it.

GOLDEN DROP, Coe. A well-known variety, originating in England. The tree is a rather slow grower and lacks in hardiness; trees are quite productive, though the fruit rots badly. Fruit large size, golden yellow, quite showy, and of fairly good quality. Ripens August 15th. This variety is not recommended for general planting.

GRAND DUKE. Originated in Europe. This is one of the finest dessert plums of the Domestica class. Tree only moderately vigorous, though hardy; upright in habit and fairly productive. Fruit large size, blue in color, with tender, buttery flesh. Quality excellent. Subject to rot. Season late. Highly recommended for home planting, but needs extra care.

IMPERIAL GAGE. Though a strong grower and fairly hardy, this variety has proved itself worthless on our soil. Fruit small and of inferior quality. Season late. Not recommended.

ITALIAN PRUNE (*Fellenberg*). Originated in Europe. This variety is moderately vigorous in growth and is hardy, but seldom fruits abundantly. The fruit is of fine quality for its group. Season late. Second best variety of the prune group tested here.



Fig. 14—Guell.

LOMBARD. This plum originated in New York. The tree is moderately vigorous in growth, quite hardy, and uniformly a heavy bearer. Fruit medium size, but only fair in quality; rots badly. Season August 15th to 20th. Though this is a very hardy plum and bears neglect much better than many others, it lacks the quality for either an amateur or commercial plum.

McLAUGHLIN. This variety originated in Maine and is one of the finest dessert plums belonging to the green gage group of Domesticas.

However, the tree has never borne more than a light crop here, and, moreover, the fruit often rots badly. Fruit large, roundish, with meaty, tender flesh of excellent flavor. Season early. A good variety for amateur planting.

NAPLES. This variety is of European origin. The tree is upright in habit and a vigorous grower. Seems to be quite hardy, also productive. Fruit is below medium size, but is of fine quality, especially for culinary purposes, also good for eating out of hand. This is one of the best varieties for canning. Season medium late. Recommended for general planting.

POND. Origin, England. Tree an upright and rapid grower; fruit of large size and fine quality for dessert purposes, but this variety is a light bearer, and the fruit is so subject to rot that we cannot recommend it even for home planting. Season medium late. It has proved an utter failure with us.

QUACKENBOS. This is a well-known variety of New York origin. The tree is vigorous, though not a very strong grower, and appears to be hardy; not a heavy bearer. Fruit is of good size and fair quality, but is quite subject to rot. Season late. We do not recommend this variety.

REINE CLAUDE. This old variety is of European origin, and is so widely planted and well known that it needs no description. It is the standard for canning. Fruit below medium size, yellow in color; tender, meaty flesh, of excellent flavor. Uniformly a good bearer. Season late. Succeeds well with us. More subject to brown rot than Yellow Egg.

SHROPSHIRE, Damson. This variety originated in England. The tree is vigorous and hardy and uniformly a heavy bearer. Fruit rather large, compared with other damsons, and of excellent quality for culinary use. The best of the damsons. Season very late. Recommended for general planting.

WASHINGTON. Of New York origin. Tree a good grower and apparently hardy, but has never borne a heavy crop. General type of tree and fruit resembling that of McLaughlin, but fruit is of superior quality for dessert use. A large showy plum, flesh tender, melting and

of fine flavor. Season medium early. This plum has value for amateur use, but is too shy a bearer for general planting; probably superior to McLaughlin for amateur work. Quite subject to brown rot.



Fig. 15—Yellow Egg.

WHITE DAMSON. This variety has only been grown here since spring of 1900 and has not yet fruited. The trees are good growers and apparently quite hardy.

YELLOW EGG. A well-known variety of European origin. Trees vigorous and quite hardy; a good bearer. Does not rot as badly as

many of the Domesticas, though none of the varieties are free from this trouble. Fruit above medium size, meaty and tender flesh, of good quality. Season medium; ripens August 1st. Though this is not equal in quality to many of the fine dessert plums, yet it is one of the best all-around varieties we have tested. For culinary use and canning, we know of nothing better. Highly recommended for general planting.

List of Varieties Recommended.

Medium Early.—Bradshaw and Washington.

Mid-Season.—Yellow Egg.

Medium Late.—Gueii and Naples.

Late.—Agen, *Prune of*; Grand Duke, Shropshire, and Reine Claude.

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Issued June 30, 1903.

